[0078] The above case is an example of the access action and the action to depart a character group containing characters that require frequent, but unsustained, access.

[0079] Another possible result of the decision-making steps **530-538** is a Yes to either of the decision steps **534** or **536**. If there is a Yes from either of these, the result is the replacement of the previously displayed character group with either Group **2** or Group **3** characters, respectively. Once either of these is displayed, the decision-making step that caused it to be displayed is immediately reached again. The result of this is that the selected character group is displayed continuously until the action key corresponding to that character group is released. As many character selections as is desired can be made from this character group while it is displayed, until the action key is released. Upon release, if no other action keys are depressed, the default character group becomes re-displayed as a result of step **540**. Here again, various mechanism may be used to detect the selection, including the sensing of a stylus on a touch screen as described above, or the movement of a cursor about the display window and the selection via the depression of a particular selection or "enter" key.

[0080] The above case is an example of the access action and the action to depart a character group containing characters that require frequent and sustained access.

[0081] A final possible result of the decision-making sequence **530-538** is a Yes to decision-step **538**. In this case, the result is the replacement of the previously displayed character group with Group **4** characters. Subsequent to this replacement another decision-making step, step **580**, is reached. This step asks whether the action key associated with this character group has been pressed again. If it has not, the Group **4** characters are displayed again. If it has, the group **1** characters are displayed by the action of step **540**. The effect of this loop, then, is to display the Group **4** characters continuously until the action key is pressed a second time. Once pressed, Group **1** characters are re-displayed and the flow returns to the decision-making sequence, steps **530-538**.

[0082] The above case is an example of the access action and the action to depart a character group containing characters that require infrequent, but sustained, access. Although depicted in a simplistic flowchart to represent the basic idea of the process, it will be appreciated that alternative means may be employed for control of the device and in particular the keyboard software application described herein. It will also be appreciated that it may be possible to reprogram, dynamically, certain aspects of the program, including the predefined timer periods, the groups to which characters are assigned, etc.

[0083] Another alternative embodiment of the present invention is one where the character display window is separated from the selection keys. Recall that the selection segments and the display window segments are considered separate items, and in **FIG. 1** the two items are shown positioned one on top of the other. **22**. When the user looks at the display segments, they are actually looking through the selection keys at the display segments. In selecting a character shown in a display segment, they are actually pressing on the selection key that is positioned on top of the display segment.

[0084] Two potential benefits of physically separating the selection keys from the display window are to remove the selection keys from the display screen in order to increase available screen space, and to apply the keyboard to devices not having an integrated touch screen, such as some cellular phones, pagers, etc.

[0085] **FIGS. 6 and 7** illustrate an alternative character selection and entry embodiment that is independent of a touch screen. In this embodiment, the character display window **150** (**FIG. 6**) is positioned "above" the selection keys **200** (**FIG. 7**), with the selection keys being hard keys that sit "under" the display window, on the back of the device. The segments of character display window **150** are positioned to approximately match up with the positions of selection keys **200**. In order to select a character, it is up to the user to match up and press the appropriate selection key that corresponds to the display segment containing the desired character. This method is advantageous in that it enables the selection keys to be pressed with fingers, instead of a stylus, and also allows the character display window to be reduced in size from one that has segments that must be large enough for convenient selecting, to one that has segments that only must be large enough to easily view. The manner of switching the character group that is displayed is equivalent to that described earlier.

[0086] Further utility is provided by this embodiment when a touch screen **15** overlays the display. In this case commands can be entered whereas the one hand **25** is entering commands by way of the touch screen and the other hand is selecting character's physical buttons **200**. Keyboard **210** may be a thin film membrane keyboard that can be is affixed to the case of the device **10** and may be electrically connected by means of the user port **30**. Alternatively, the keyboard **210** may be integrally manufactured with the device, or at least its outer case, and connected via **30** internal data channels (not shown). FIGS. **8-10** further depict this approach by adapting the display and the button juxtaposition concept to portable personal electronic devices such as cell phones, PDA's, text messagers, VCR and other electronics controllers, and Internet connection devices. In this embodiment the user has available an array of buttons which are ergonomically positioned for one or two-handed operation. Ideally control buttons would be located on the front and character selection buttons on the rear as discussed above. In this manner the user holds the device in both hands and the thumbs activate the top-side buttons and the fingers access the buttons on the underside.

[0087] **FIG. 8** shows a portable electronic device design that is optimized for fast and convenient input. It uses the character input technique described so far in this application, i.e. a keyboard associated with a display window, that alternately displays a plurality of character groups, and that has selection buttons associated with each position in the display window.

[0088] In this optimized device, as with the embodiment in **FIGS. 6 and 7**, the character selection buttons are placed on the opposite side of the device as the display screen. The same benefits realized above are also realized here: (1) with the selection buttons apart from the display screen, the keys can be made much larger than if they are on the display, (2) with the selection buttons on the back, they can be pressed with fingers, rather than using a stylus, and (3) the character display window size can be minimized. The consequence of this device design is that the display screen can be made as